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BIENNIAL REPORT

1965-67

COUNTY OF LOS ANGELES
DEPARTMENT OF ARBORETA
AND BOTANIC GARDENS

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1965-67

ARBORETUM

DESCANSO GARDENS

SOUTH COAST BOTANIC GARDEN

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County of Los Angeles

Department of Arboreta and Botanic Gardens
301 North Baldwin Avenue, Arcadia, California 91006
Telephone: 681-5277 or 446-8251

Board of Supervisors
County of Los Angeles
500 West Temple Street
Los Angeles, California 90012

Gentlemen:

The objectives of this department are to provide botanical and horticultural services for citizens of the County. These services are based on the research and education programs which distinguish an arboretum or botanic garden from a horticultural park or display garden. In turn, the research and education programs give meaning to the plant collections that form the backbone of our department.

The accompanying report summarizes the services provided by the department at its three major facilities.

The new South Coast Botanic Garden has been developed in this past biennium to the point where it now can be opened to the public on a four-day-a-week basis. This is essential to the citizens of the area who have been anxiously awaiting the transformation of the onetime dump site into a botanic garden. It also represents tangible recognition of their generous contributions of time and money given to the achievement of this goal under the leadership of the South Coast Botanic Garden Foundation.

Similarly, the achievements of the California Arboretum Foundation and the Descanso Gardens Guild, recorded in this report, are impressive examples of how the County's investment in the department stimulates participation by private citizens.

This report presents the main accomplishments of a staff of one-hundred and thirty. It was compiled and edited by Mr. Don Dimond, Public Information Assistant. The art work was by Mr. Louis Ayala, Graphic Artist, and the typing by Mrs. Lorene Johnson.

Respectfully submitted,

William S. Stewart
Director

WSS:lj

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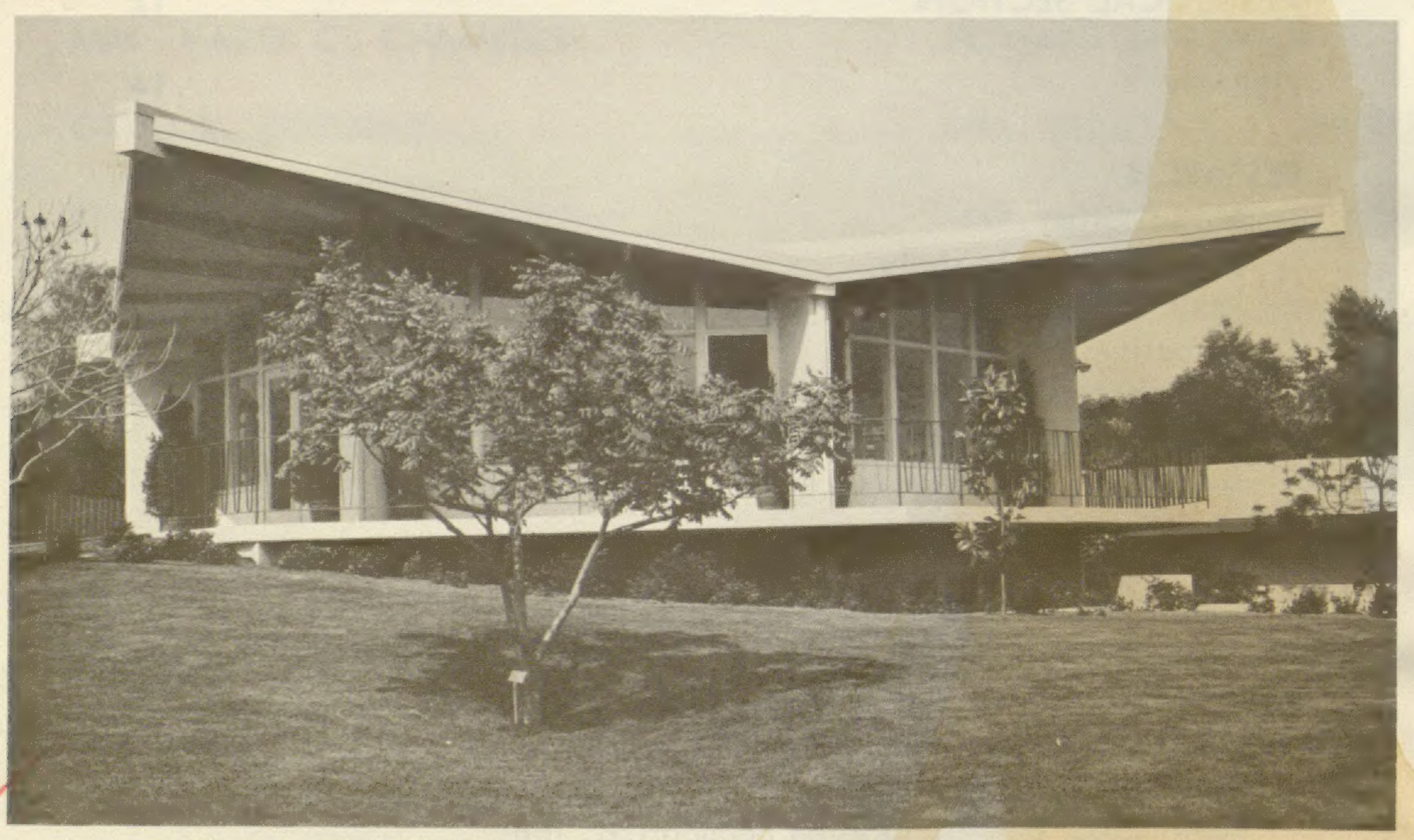
GROUNDS DEVELOPMENT

MAJOR CONSTRUCTION

Descanso Gardens -

Oriental Teahouse, presented to the County of Los Angeles by the Descanso Gardens Guild at a dedication ceremony June 3, 1966. The structure cost $50,000, paid for by the Guild through its Teahouse Fund for which it had been raising money over the past six years.

An instant success with the public, the Teahouse and surrounding Japanese Gardens were viewed by 49,776 visitors the first month.

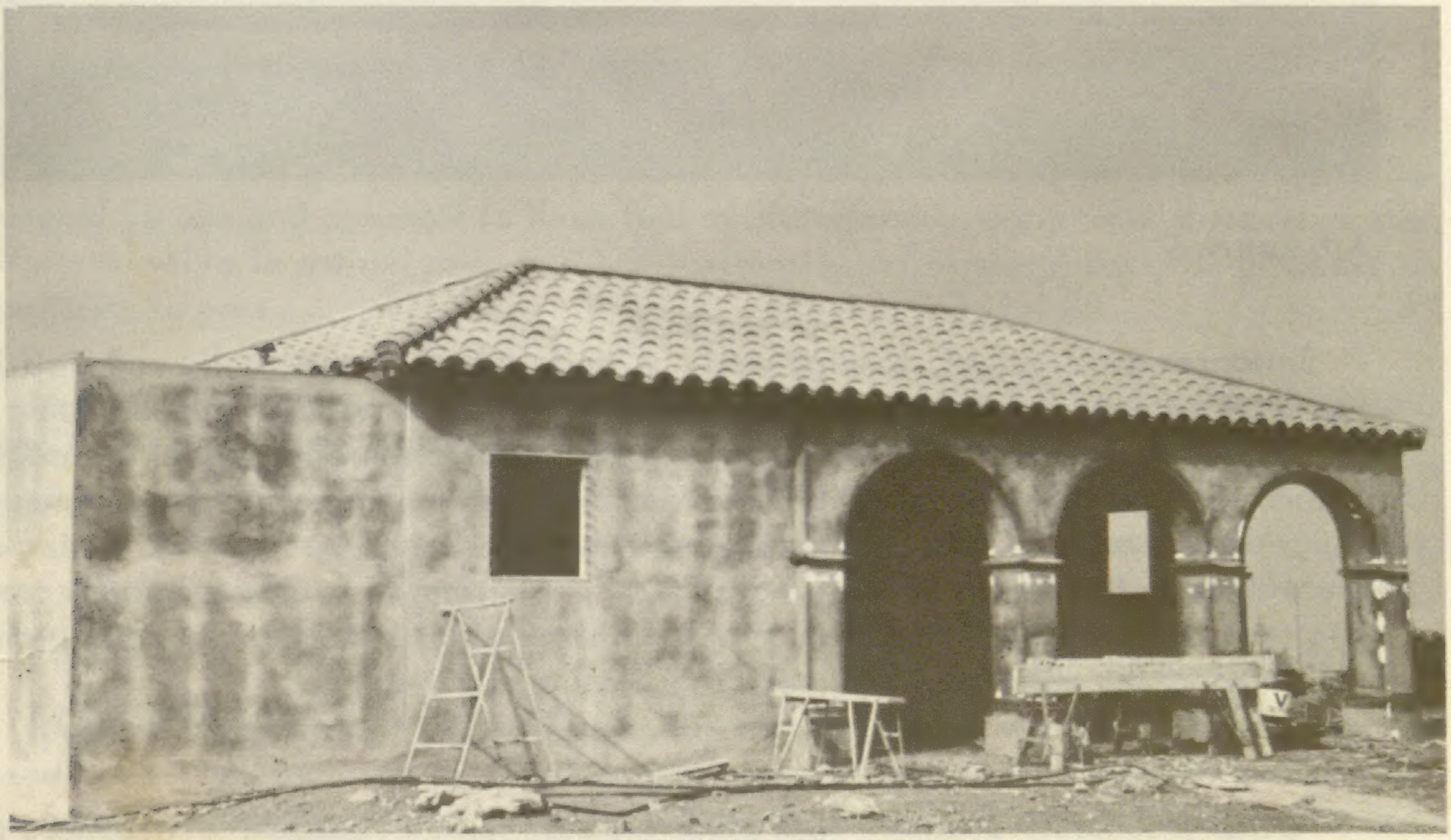


Arboretum -

Peacock Pavilion, dedicated May 18, 1967. The $85,000 structure provides a public eating facility on upper level, book and gift shop and office for the California Arboretum Foundation on the lower. (See AFFILIATED FOUNDATIONS for CAF contribution.) The largely glass walls of the circular structure afford visitors a panoramic view of the grounds and the San Gabriel Mountains to the north.

Arboretum -

215-car parking lot south of historical area and parallel to Baldwin Avenue. Gate at northwest corner of lot will provide entry to grounds. Lot was built to replace existing parking area on northern part of grounds that will be given up to accommodate on-ramp for new freeway. Area in photo between western edge of parking strip and fence will be landscaped with trees and shrubs.



South Coast Botanic Garden -

Begun in the spring of 1967, this structure will house public rest rooms, an accommodation which will permit opening the garden to visitors more often than the present single five-hour day per week.

Arboretum -

Additional significant construction at the Arboretum included two 60' x 12' shelters for two trams, a 1,400 square foot storage building, and housing for smog filters, all built by the Maintenance Section. Concerning the filters, in the past, some research work has been lost because of smog; the success of present filters in the Research Greenhouse has led to plans to install similar units in two large propagating greenhouses.

Arboretum -

Entranceway forecourt, looking west. A delight both to the public and staff is the continuing development of the complex of formal lawns and associated landscaping bordering the Bauer Pool. This biennium saw the installation of a ring of fountain jets around the single, high-pumping center jet; the construction of concrete benches at the westernmost end; the construction of a marble-topped walk and adjoining concrete steps on the north and south sides; and the planting of twelve jacaranda trees in two rows on the lawns. Installation of a final sprinkler system completed automatic irrigation of the entire area, thereby facilitating maintenance.

Other grounds development took place around the new Peacock Pavilion (see photo preceding page) where barren, construction-pocked land was transformed into an attractive garden within a few days. Gardeners, maintenance men, and tree crew joined forces in reconditioning the soil, installing a sprinkler system, and planting fourteen large trees plus many small plants and shrubs, topping off a brilliant example of near-instant landscaping by laying 3,000 square feet of sod in two hours.

Descanso Gardens

Aside from building construction, there was considerable physical development of the grounds. The most prominent was the completion of the redesigning and widening of the main entrance, a project which involved moving 250 feet of redwood fence 100 feet back from its previous position, putting in a new sprinkler system, new lawn and landscape plantings.

Some additional improvements were: laying of an 8-inch pipeline to the new Oriental Teahouse to assure adequate fire protection; laying of 300 feet of electrical conduit for the night lighting area of the gardens; a redwood shelter for a public rest and view point; resurfacing of 500 feet of garden roads; and two new hiking trails in the hilly area south of the gardens proper.

As in past periods, the Gardens benefitted from the generosity of private citizens who provided a number of valuable items, among them a gasoline powered utility cart, one hundred clumps of Bird of Paradise plants, and a new stone bench in the Native Plant Garden. (For other donations see AFFILIATED FOUNDATIONS: Descanso Gardens Guild, Inc.; Los Angeles Camellia Council.)

South Coast Botanic Garden

The history of the development of this very young botanic garden (1960) is an especially interesting one because of the character of the land—a onetime dumpsite covered by one and one-half to three feet of diatomaceous earth—and because of the efforts to solve in esthetically and horticulturally satisfactory ways the problems it continues to pose.

Horticulturally speaking, the heat and cracking engendered by decomposing rubbish makes the growing of some plants uncertain. On the other hand, that same soil in which temperatures in close-to-the-surface fissures have reached 117° F. provides a unique botanical laboratory for experimentation and testing. A successful example were the four and one-half acres of experimental lawns of Hybrid Bermuda, Tifgreen, Tifway, and Santa Ana 145 planted in late 1965.

Physical development in addition to the construction shown in the photograph on page three, included the completion of three all-weather tram roads in and around the main body of the garden, a greenhouse for children and a greenhouse for volunteer propagators.

South Coast Botanic Garden

A two-and-a-half-acre lake and circulating stream roughly 20 feet wide by 1000 feet long, were included in the original development plans for South Coast Botanic Garden. The stream bed rested on some 75 feet of trash, requiring the building up of intervening waterproof layers that would prevent seepage and consequent accelerated decomposition of the sub-base. Work was begun on the intervening layers—soil, bentonite, flexible composition membrane, sand—during this biennial period. The photograph shows an early stage of construction. The Department received major assistance from the County Sanitation District on this complex job which, in its final stage, will see 2500 tons of Palos Verdes rock placed along the stream bed and on a number of small weirs, thus making the stream a succession of small dams and pools. When this work is completed the entire stream area will be landscaped.

Tree Maintenance

The Arboretum and Descanso Gardens are serviced by a common arboriculture section. The character of the work and comparative workloads are indicated in the following table:

	1963-5	1965-7
Trees trimmed and topped	4325	2803
Trees removed	891	915
Trees sprayed for pest and disease control	16,184	4188
*Telephone calls	1800	1612
Trimming of vines on fencelines adjoining city streets	0	32,000 lineal feet

The foregoing figures are representative, not complete. They reflect, however, the basic trend: growing efficiency in such areas as pest control that will be offset, in terms of workload, by an increasing number of trees to maintain. Variables in work force and acquisition of equipment are factors that make some figures misleading. The trimming of 32,000 feet of vine, for example, was undertaken only after the acquisition of an aerial boom in 1965; to have done the work prior to this time would have required doing it with the aid of a stepladder, an operation too inefficient to be acceptable.

*Telephone calls during the 1963-5 period included those asking for information on turf and pest control, queries now channeled to staff specialists; the 1965-7 figure represents calls for tree information alone. (See report under PUBLIC SERVICE.)

Introductions

The introduction of new plants to the nursery trade is an important function of any arboretum or botanic garden. The high number of introductions over the years by the Arboretum and Descanso Gardens reflects the importance the Department attaches to this work.

In this biennium the Arboretum has introduced Arctotheca calendula, a large, yellow, daisy-like flower that makes an excellent ground cover on hillsides; and Cassia splendida, a 10-12 foot evergreen shrub native to South America that pro-- duces clusters of large, showy flowers, but very little seed, a fact that at first seemed to preclude its introduction until the Arboretum staff developed a propagating bench which, together with certain chemical growth regulators, made it possible to propagate the plant vegetatively. The technique was passed on to the nurseries which in turn were enabled to make this outstanding Cassia available to the public.

At South Coast Botanic Garden a new, yellow "Palos Verdes" marguerite was introduced to the nursery trade following its discovery in 1966 on the grounds of the garden.

EDUCATION

The programs and services of the Education Division are supplied by Youth Education, Adult Education, and Information sections, various staff specialists, and a small but significant corps of volunteers. Altogether this staff has not been enough to meet the ever-growing demand from school districts, the public, and various special-interest groups. As an example, requests are so numerous for school field trips that schedules are already being made for 1969. The Division hopes to improve this situation through continuing effort to cultivate volunteer aid, through the development of new courses of instruction in association with academic institutions, and by various forms of automated instruction.

Youth Section - Workshops: Year-round classes concerned with plants, gardening, nature and art. Held outside regular school hours; intended as an enriching extracurricular experience.

	Arboretum		Descanso		South Coast	
	1965-6	1966-7	1965-6	1966-7	1965-6	1966-7
School grades	1 through 9		1-9	1-8	*	5-6
Workshops	38	31	24	22		1 (summer)
Students registered	505	365	383	291		12
Subjects	15	12	14	10		
Cities represented	17	16	7	9		

* Pilot program of 10-week workshop with 12 students

Youth Section - Field Trips: Plant science, nature, weather, and California history for elementary grades. Scheduled in cooperation with school districts; conducted during school hours by Information Section tour guides and trained volunteers. Intended as an experience for teachers as well as students.

	Arboretum		Descanso		South Coast	
	1965-6	1966-7	1965-6	1966-7	1965-6	1966-7
Trips	497	471	151	179	36	58
Students	17,128	16,546	5,464	6,084	1,198	1,744
Teachers	534	527	245	269	58	63
Cities	58	71	16	19	9	7

Arboretum -

4th graders on tour of historical area, stop at Indian wickiups with volunteer information aide, Mrs. John Arozena, to hear factual stories about Gabrielino Indians and their wickiup homes. Tour was one of 968 scheduled school field trips conducted by Arboretum staff members or trained volunteers during the 1965-7 biennium.

Youth Section

Arbor Day, March 7: Annual event commemorating the birthday of Luther Burbank and National Conservation Week.

1966

Arboretum - 1,550 children attended, all receiving a tree seedling, Cassia leptophylla.

Descanso - 870 children attended, all receiving a tree seedling, Tabebuia chrysotricha.

South Coast - Dodonaea viscosa were given to 225 people.

1967

Arboretum - 1,163 children attended, all receiving a tree seedling, Cassia carnival.

Descanso - 1,100 children attended, all received a tree seedling.

South Coast - 500 persons attended, 700 seedlings were given during the day.

The Southern California Edison Company provided tree booklets for all the children attending these events.

Volunteers

The value of volunteer aid in teaching, conducting tours, working in greenhouses, registration, lesson planning, and other matters related to education services cannot be overestimated. A look at the following figures tell why:

Arboretum - During the 1965-6 period volunteers gave 397 hours to teaching; 116 hours to greenhouse and garden maintenance.

During the 1966-7 period 8 workshop teachers gave 467 hours of help, including teaching; 80 hours were given to work in the Junior Museum, registration and lesson planning, and planning for special instruction for EMR (Educable Mentally Retarded); 60 hours to propagation and maintenance.

Descanso - 89 hours of volunteer aid in 1965-6; 89 hours in 1966-7.

South Coast - In 1966-7 the entire School Tour program and Youth Group tours were conducted by volunteers who gave a total of 110 hours, including their own training. Another 30 hours was given to the preparation and teaching of an 8-week pilot course.

Adult Section - Courses designed mainly for the home gardener, but also for the professional. Conducted in association with the Pasadena City College Extended Day Program and the UCLA Extension Division with instructors from those institutions and from the staff of the Department.

	Arboretum		Descanso Gardens	
	1965-6	1966-7	1965-6	1966-7
Classes	10	10	6	5
Subjects	8	8	3	3
Attendance - 28 weeks	1,948	1,486	1,714	1,795

Gardener School

A 42-week course (1965-6) conducted four hours a day, five days a week, provided intensive theoretical and practical training for 25 students, among whom were mature gardeners seeking to upgrade their knowledge and techniques, and young men who were dropouts from formal school programs. In its five years of operation the school has seen better than fifty percent of its graduates acquire full-time jobs in gardening or horticulture.

PUBLIC SERVICE

Each of the facilities of the Department serves as a kind of horticultural clinic to which the public may bring its gardening problems for analysis and prescription. The Arboretum particularly is active in this regard owing to the presence and availability of its research staff and the staff's involvement with such matters of common interest as herbicides, pesticides, air pollution, plant propagation, and fertilizers.

The extent of the service is considerable.

At the Arboretum, the office of the plant taxonomist is currently identifying plant material at the rate of approximately 3,000 pieces each year. The offices of the turfgrass and fire-retardant plant specialists—the Arboretum is probably unique in having such specialists on its staff—have increased their daily contact with the public by 30% in this biennium, an increase that may be attributed to population growth accompanied by home-owners' desire for lawns, and growing awareness of the fire hazard in the chaparral-covered hills of the southland.

Other offices of the Research Division are in similar, if not always as frequent

contact with the public. It is worth mentioning that a good part of this service is of more than casual significance. Prompt and correct identification of narcotic, poisonous, or allergy-producing plants, for example, can be of critical importance to physicians, hospitals, veterinarians, and law-enforcement agencies.

Information Section

Directly or indirectly involved with every activity of the Department, the Information Section constitutes the initial person-to-person contact with visitors to Descanso Gardens, the Arboretum, and soon, with the expected increase in public visiting hours, with visitors to South Coast Botanic Garden. The Information Section thus serves as the connecting link between the visitor and whatever he may wish to do, or whomever he may wish to see.

This public relations role is extended to some 14,000 tram tours for 650,000 people (1965-67) conducted by Information Section Tour Guides who give an informed lecture on the central aspects of Descanso Gardens and the Arboretum on each tour. Not included in these numbers are tours for special groups—Chambers of Commerce, Veteran's Hospitals, Old Age Homes, garden clubs, and the like—accounting for an additional 2,000 persons each year.

Of the 1,298 school field trips given to 46,997 students and teachers in this biennium (See EDUCATION: Youth Section—Field Trips), approximately 96% were conducted by Information Section Tour Guides.

HISTORICAL SECTION

The Arboretum is unusual among botanic gardens in occupying land so rich in historic interest. American Indians, Spanish missionaries, Mexican rancheros, and a succession of pioneers and adventurers lived innocently and not-so-innocently on these and thousands of surrounding acres, leaving architectural, horticultural, and other records of their times for today's visitors, students, and historians.

Interior maintenance of three principal buildings—Queen Anne Cottage, Coach Barn, Hugo Reid Adobe—continues to be largely the work of volunteers and the California Arboretum Foundation, working under the guidance of a staff curatorial aide. Much credit is due a new volunteer group, Las Voluntarias, formed in the latter half of this biennium. In addition to maintenance work, Las Voluntarias have raised funds

for various improvements, have served and continue to serve as guides for school tours of the area, and have assisted in accessioning. These contributions have helped immeasurably in freeing the curatorial aide for cataloguing, interpreting and, in many cases, restoring gifts and loans of artifacts covering the historic period.

Arboretum -

Arboretum -

A velour traveling suit and simple vanity set rest on handmade quilt, three of fifty-nine objects added to the Historical Section collections in this biennium. The traveling suit was worn by a member of the family of Elias J. Baldwin, onetime owner of present Arboretum site and builder, in 1881, of the Queen Anne Cottage. The suit is the gift of Mrs. Betty Baldwin, a distant relative. The vanity set is from the Northrup Collection; the quilt (c. 1850) from Margaret Griffith-Jones, member of Las Voluntarias.

The horticultural aspect of the historical section resides in a 100-year old eucalyptus tree (pictured here in front of the Queen Anne Cottage), in elm trees, and in an impressive hedge of pricklypear cactus (variously useful, ornamental, or noxious, depending on where it is grown) ringing the Adobe, and a variety of annual and perennial flowers that of course must be periodically replaced in order to retain the character of the land as it was a century and more ago.

Among botanical garden libraries, the LASCA (Arboretum) library is uncommon in that it is open on a reference basis to the public as well as to the staff. Its diversified botanical and horticultural holdings include strong sections on world floras and on the culture of ornamentals. There is also a good representation in natural history, and a modest collection covering the history of the area.

Public use of the library has increased from 3,310 persons in the 1965-6 period, to 4,229 in 1966-7. A sizable part of this increase was represented by students especially from two-year and four-year colleges.

Acquisitions - In this biennial period catalogued holdings increased from 14,430 to 16,329, an average of 949 additions per year. Uncatalogued items increased from 12,763 to 13,812. Currently received periodicals increased from 330 to 350. Fields that have been enlarged include virology and local history.

Among outstanding purchases were: Martius - Flora Braziliensis, 15 vols., (reprint); Andrews - Botanists Repository (10 vols.); Paxton's Magazine of Botany (16 vols.); Journal of Experimental Botany (complete set); Trimmen and Hooker-Flora of Ceylon (7 vols.); and Maiden - Forest Trees of New South Wales (8 vols.).

Important gifts included 132 issues of Phytopathology; 28 issues of Virology; Guerin - Dictionnaire pittoresque a histoire naturelle (11 vols.); 98 issues of Hilgardia; Nuttall - The North America sylva (3 vols.); Dawson - Birds of California (3-volume student edition).

The library now handles 5 motion picture films available for loan and 9 microfilm items.

The major part of the Department's research activity is conducted at the Arboretum. Here, a staff representing the principal botanic divisions—physiology, pathology, taxonomy, genetics, entomology—is engaged in various programs seeking answers to some plaguing questions of the day: air pollution damage to plants, the hope of reducing the fire hazard in open areas through the study and cultivation of fire-retardant plants, and seeking to enrich the urban environment through the introduction and breeding of ornamental plants adaptable to the climate of Southern California.

Air Pollution

The investigation of air pollution in relation to plants, the effect of one upon the other, constitutes a significant and continuing part of research activity at the Arboretum. In the 1963-5 period, a project was carried out under a grant (AP 00137-04,05) from the National Institutes of Health to explore means of protecting plants from that combination of compounds known scientifically as peroxyacetyl nitrates (PANS), or popularly as smog. A powder, gum guaiac, and a liquid, propyl gallate, were shown to be effective in providing protection from damage caused by ozone.

In the biennium covered by this report, an investigation supported by another grant (AP 00137-06,07) from the National Institutes of Health examined the effect of shade trees on smog. Results in this investigation indicated that air in areas of shade contained considerably less smog than air in sunlight; that according to the degree of air movement, the reduction of smog in the shade varied from nearly complete elimination to no difference whatsoever when there was a breeze.

Other observations during the past twenty-four months showed that: (a) plants in an enclosed chamber were effective in reducing the ozone concentration by as much as 60%; (b) in the field no corresponding effect could be observed, although shade trees, or any source of shade, had an effect in reducing the naturally occurring atmospheric oxidant concentrations; (c) gum guaiac was not effective in reducing oxidant concentration when used in several kinds of commercial air conditioners, although in the laboratory in air scrubbing columns it was very effective in eliminating photochemical smog.

The project suffered a great loss by the death on March 13, 1966 of Mr. W. M. Noble, Research Assistant.

Chemotaxonomic Study on Cotton Pigment

This study, directed by Dr. C. P. Parks, formerly staff geneticist, now assistant professor of botany at North Carolina State University, was carried out under National Science Foundation Grant GB-3900 and completed in this biennium. Dr. Parks' review of the study follows:

"Chemical constituents of plant tissue can be very useful in the classification of the plants which contain them. Much such classification has been done in the general area of chemotaxonomy using the procedures of paper chromatography. From our studies, it has been observed that some consistent errors can result if paper chromatographic analysis of crude plant extracts are the only basis for comparison. Our first objective has been the development of a suitable modified extraction and analysis procedure.

"These studies have been carried out on the flavonoid pigments found in cotton flower petals. The diploid cottons native to the New World (mostly Mexico) have been our basic plant material. A collecting trip to Mexico resulted in the introduction of Gossypium trilobum into cultivation. (This cotton species has not been grown in the United States previously.)

"We have found that a preliminary column-chromatographic separation of the crude alcoholic pigment-petal extract, followed by two-way paper-chromatographic separation of fractions from the column, better separated the pigments present in the original mixture. The pigments are characterized by the column fractions in which they occur, their paper-chromatographic behavior, and their ultraviolet spectrum with and without the addition of certain reagents to the pure pigment.

"Using this procedure, all of the species of the New World diploid group have been analyzed, and a paper on this study as well as one on the basic method is being submitted for publication. The results of the chemical study of these wild cottons are being compared to results of a study on their gross morphology determined from herbarium specimens."

Plant Pathology

Oak root-rot fungus remains a major problem for home gardeners in this area. This fungus is capable of infecting almost all ornamental woody plants, including certain herbaceous plants. Fumigants such as carbon disulfide and methyl bromide are helpful for soil sterilization and in eliminating the source of infection, but their effectiveness is limited by moisture, clay pans, rock, large roots and living plants in the treated area.

The Arboretum research project seeks systemic chemicals for possible control of oak root fungus. These chemicals seem to be transported internally in a similar way as plant growth hormones. It is believed that systemic chemicals having specific inhibitory effect to Armillaria mellea may be used to prevent the fungus infection and to curb further advance of the disease. So far, 20 systemic chemicals have been

evaluated in preliminary medium assay. Three of these are effective in curbing the growth of the fungus mycelium below 50 ppm level.

Studies on plant viruses have been in progress since 1966. This has been made possible by acquiring a Spinco Model L ultracentrifuge for virus preparation and the charcoal smog filter for the virus greenhouse to eliminate smog damage to the virus assay plants.

Particular attention has been directed to the study of the reaction of plant species to tobacco mosaic virus infection. It has been demonstrated that plant tissue exhibits a defense mechanism against virus infection by producing antiviral substances during the course of virus multiplication. Studies at the Arboretum involve investigation of this reaction on various host species, correlated symptom development, virus concentration, and possibly the production of antiviral substances for each species studied. Also being studied is the effect of herbicides and growth hormones on virus multiplication in plant tissue.

Herbarium

More than 5,000 herbarium specimens were collected or otherwise added in this biennium. Current total holdings of the LASCA (Arboretum) Herbarium are now in excess of 30,000 sheets together with supplementary reference materials.

Approximately 500 specimen sheets were received on exchange from the California Academy of Sciences, the Morris Arboretum, and the U.S. National Arboretum. Nearly 1,500 exchange sheets were distributed to five cooperating institutions. Several hundred other sheets were prepared for referral to specialists for consideration.

Over 500 sheets of the American diploid cottons, in support of taxogenetic studies of Gossypium currently nearing completion at LASCA, were secured by loan arrangements with eight domestic herbaria.

A long-anticipated series of field collecting trips was started with the aim of acquiring for the herbarium a thorough sampling of woody ornamentals in cultivation along coastal and Southern California. This long-range effort is designed to provide relatively complete herbarium representation of the subtropical ornamental flora within California horticulture. Three extensive field trips were completed in the 1965-7 period, one to the San Francisco Bay area, another to the Carpinteria-Santa Barbara region, both proving exceptionally productive.

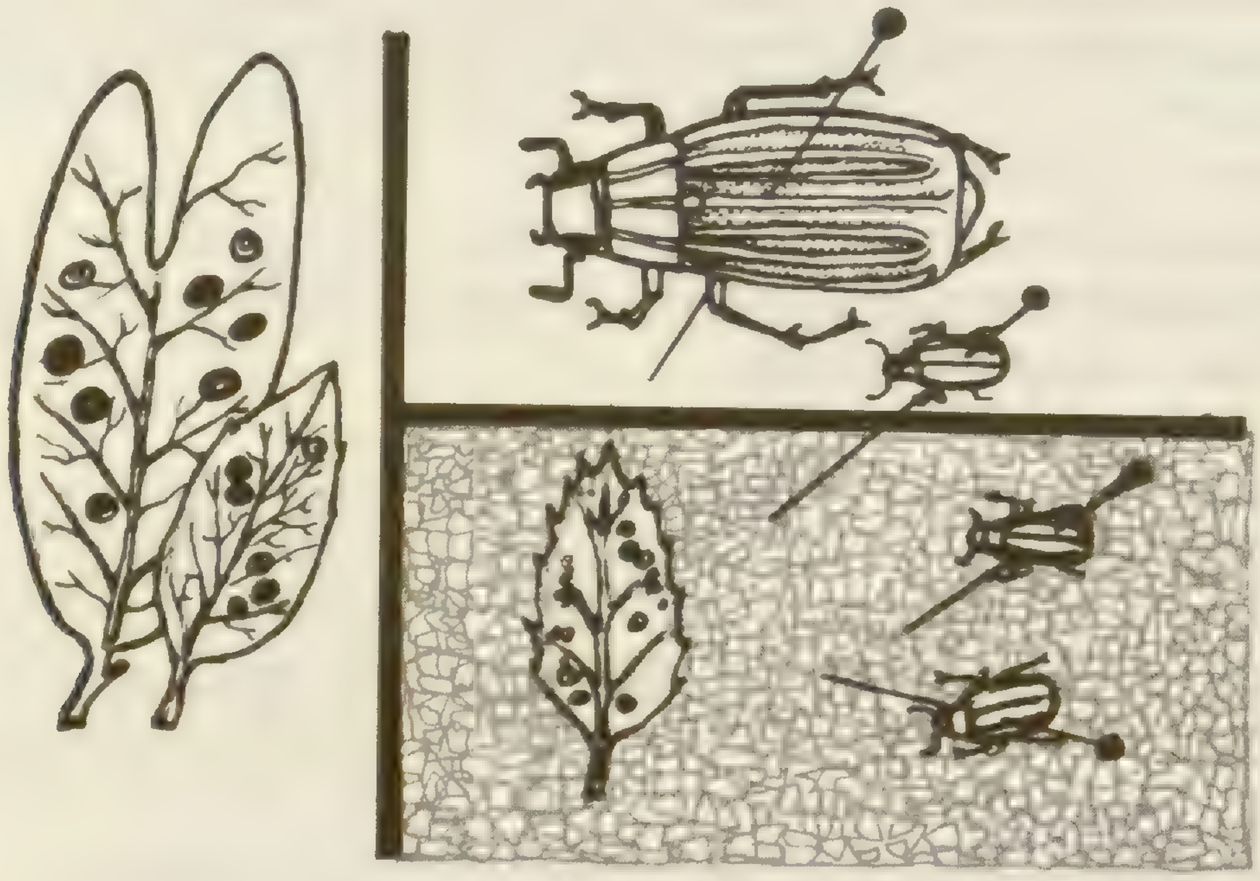
Major effort in the herbarium has been directed towards processing raw field collections. This work suffered a great setback in December of 1966 with the death of volunteer assistant, Vernyce I. Turner. Miss Turner's dedicated service and high competency contributed in a most significant way to the development of the LASCA Herbarium. Her loss leaves an irreplaceable void in staffing the facility.

Entomology

Having established that aphids are one of the most prevalent and injurious groups of insect pests present on the wide range of host plants growing at the Arboretum, a survey was begun in April of 1966 to relate the different species of aphids with their host range and seasonal distribution and, also, to determine which species of plants are normally free of aphid attack.

So far, 2,032 samples of aphids have been collected from 1,202 species of host plants, the collection data recorded, the plants labelled, and the aphids sent to specialists for identification. The work is proceeding with the valuable assistance of Dr. M. D. Leonard, Insect Identification Branch, Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. Although the survey is incomplete, it has already yielded significant information; for example, aphids have been found on 80 of the 183 species and subspecies of eucalyptus examined, on 35 of the 40 species of pines, and 38 of 50 species of viburnums. It has also indicated that Myzus persicae is the most common and widely distributed of the aphids found.

In addition to the work on aphids, thrips, grass leafhoppers, and scarab beetles have been collected and sent to specialists for identification.



Fire-Retardant Plants

In 1953 the Arboretum joined the fight against the fire hazard presented by Southern California's arid mountains and foothills by engaging in part-time cooperative tests and studies with the U. S. Forestry Service. Since that time, the Department's role in the struggle has expanded to its current status as a full time research and public service project headed by a staff plant physiologist.

Research has centered on selecting plants that are slow burning, or relatively non-flammable, and testing them in a controlled temperature muffler furnace. The Cistus, or rockrose, was the first plant to substantiate fire-retardant promise. The list has since grown to include today some 20 plants with proven, though varying, fire-retardant qualities.

Part of the research project involves a comparative study of the significance of moisture content and moisture-holding capacity in fire-retardant and non-fire-retardant plant species.

Here, using a benzene distillation method, Kenneth Montgomery, Biology Assistant, is recording total water content in plant tissue samples.

Public Service and public information activity have taken the form of publications, lectures, and a wide showing and loaning of a documentary film, "Greenbelt, U.S.A.," to which the Arboretum contributed writing and editing services. In the 1965-7 period lectures were given before the Los Angeles City Fire Department; Burbank Chamber of Commerce; Los Angeles City Planning Commission; Board of Fire Commissioners; Naval Ordnance Test Station; and U.S. Atomic Energy Commission.

Turfgrass

The Arboretum is the only botanic garden in the country with a significant program in turfgrass research and education. It is conducted in recognition of the responsibility and problems associated with 60,000 acres of residential lawns in Los Angeles County valued at $280 million which require at least $80 million a year to maintain.

Major aspects of the program are the maintenance of variety and test plots for display and research, and various public information and service projects. These latter include answering inquiries from home gardeners, staging expositions at the Arboretum and throughout the county, giving formal lectures, and disseminating technical information to community groups, professional societies, and college classes.

Activities in this biennium were similar to those of the 1963-5 period, but considerably expanded. Five "Operation Green Carpet" home lawn exhibitions were conducted at the Arboretum and South Coast Botanic Garden; thirty-seven lectures and training sessions were given before municipal, professional, and home garden groups; approximately a thousand telephone and personal conferences were conducted with home gardeners; sixteen field-problem calls were answered covering such matters as weed control, irrigation, varietal selection, and over-all turf management.

Contributing to both the public and research aspects of this program are the continuing cooperative investigations with the Los Angeles County Agricultural Extension Service, the University of California Agricultural Experiment Station, and various companies of the turfgrass industry.

In the coming biennium, the turfgrass program will be conducted under the administration of the Education Division, a move calculated to widen public knowledge of scientific advances in the field.

Camellia

Camellia research activities at the Arboretum have been summed up in a series of six articles that will appear in the 1968 issue of the American Camellia Society Yearbook. These activities embrace an extensive project which began in 1961 and which has been carried on since in cooperation with a number of scientific societies and individual specialists.

The basic aim of this research is to study the inheritance and gene pattern of flower color and fragrance. The resultant data is expected to pave the way for the breeding of new color possibilities. Complementary to this effort is the emphasis given to the breeding of cold-resistant camellias.

Hibiscus

From 1957 to the present day, the breeding, observation, testing, and selection of hibiscus hybrids, followed by the distribution of seed, plant materials, and publication of resultant information, has been carried out at the Arboretum by two research associates, Ross H. Gast and Joseph Staniford. Details of this work, for which the Arboretum gratefully has extended its facilities, may be found in publications catalogued in the Arboretum library.

The underlying objective of Mr. Gast's and Mr. Staniford's research project may be simply stated as the development of plants with root systems tolerant of wet, cold winters which will at the same time return high quality flowers with good commercial prospects. The greatest promise in achieving this goal has come from hybridizing the best existing varieties with species and varieties from all over the world which appear to have the desired characteristics.

Accomplishments in the 1965-7 period include: 401 successful crosses resulting in 5,500 seed, a good part of which is marked for distribution to other research groups; planting of 175 seedlings expected to be ready for nurserymen during the 1968 blooming season; and seed distribution to collaborators in Mexico, South Africa, Australia, New Zealand, and New Britain.

Plant Records Unit

The Plant Records Unit consists of a Plant Recorder and Assistant Plant Recorder responsible for accessioning and for recording the history, cultural data, nomenclature and disposition of all plant or seed acquisitions arriving at or leaving the Arboretum. The unit is also responsible for receiving, cleaning, packaging, storing and issuing of seed used for planting at the Arboretum, and for preparing seed for exchange with other arboreta and botanic gardens throughout the world.

Seed and Plant Control Statistics

	1963-5	1965-7
Accessions	3,206	3,346
Seed planted	2,154	2,835
Cuttings inserted	11,165	28,020
Plants into one-gallon cans	9,605	4,923
Plants moved to permanent field location	3,391	5,281
Identification labels made	4,608	17,220

At the time of this report there are at the Arboretum approximately 5,973 accessions, 170 families, 1,056 genera, 3,420 species, and 1,398 varieties of plants in the field.

The seed exchange program with foreign botanic gardens has increased in this biennium from 135 to 399. 4,163 packages of seed were sent, and 2,082 received from botanic gardens in almost all parts of the world, including Hong Kong, Taiwan (Formosa), Pakistan, Iraq, Egypt, Israel, Rhodesia, and 42 Soviet republics. New contacts were established with several Japanese, African and Australian gardens. Contacts with Central and South American gardens remain very limited. Domestically, the Arboretum exchanges seed with 110 botanic gardens located throughout the country.

Weather

Daily reading of temperature, rainfall, water evaporation and relative humidity are recorded and forwarded monthly to the Los Angeles County Flood Control District from the Arboretum Weather Station No. 1037-E. In addition, from November 15 to February 15 of each year the Arboretum sends to the United States Weather Bureau Frost-Warning Service in Pomona, daily information from which is determined possible frost for the western San Gabriel Valley. Weather data is referred to and used by the Arboretum staff, Research Division, Smog Control Unit, and many newspapers and water departments in the area.

Weather data for the two year period:

	1965-6	1966-7
Lowest temperature	30° — Dec. 28, 1966	32° — Jan. 1, 1967
Highest temperature	104° — Aug. 8, 1965	100° — Oct. 30, 1966
Total rainfall	24.88 in.	28.87 in.
Total days of rainfall	33 days	47 days
Heaviest monthly rainfall	November — 14.39 in.	December — 8.13 in.

AFFILIATED FOUNDATIONS

California Arboretum Foundation

The CAF, a nonprofit organization incorporated in 1948, continues to pursue its basic aim of contributing to the development of the Arboretum through: donations, monetary and non-monetary; Foundation memberships; services to Arboretum visitors.

The Foundation is governed by a Board of Trustees, consisting of twenty-five Foundation members elected for a three-year term. Current officers are:

President	Dr. Arie J. Haagen-Smit
Vice-President	Mrs. Forrest Q. Stanton
Secretary	Mr. Ernest E. Hetherington
Treasurer	Mr. Howard A. Miller

A staff of four and an executive secretary are in charge of the offices and gift and book shop. As of June 30, 1967, the Foundation had 641 members.

Listed below are the major contributions made by the Foundation in the past two years:

1. Funds designated for perpetuation of the Historical Section provided viewing windows in the doorways of the Hugo Reid Adobe. ($345)
2. Funds for purchase of rare books for Arboretum library. ($1,217.77)
3. Matching funds with Sunset Magazine for plantings in Home Demonstration Gardens. ($600)
4. Funds to obtain rare plants for Arboretum greenhouses. ($346)
5. Donation of plants and seeds in the amount of $7,500.
6. Publication of a quarterly, "Lasca Leaves," for distribution to members, botanical gardens, educational institutions, and government agencies. This publication contains scientific, historical and educational articles related to the Arboretum and its work, and provides a source of exchange for publications from other scientific institutions.
7. Funds for trees for Arboretum and Arbor Day ceremonies. ($86)
8. Funds for hibiscus research project. ($828) (See RESEARCH: Hibiscus)
9. Grant awards for research from:
    a. National Science Foundation. Amount: $31,000. Project: "Analysis of Leaf and Flower Petal Flavonoids as an Index of Taxonomic Differentiation in the Diploid Species of 'Gossypium'." (See RESEARCH: Chemotaxonomic study...)
    b. National Institutes of Health. Amount: $22,879. Project: "Air Pollution Effects on Plant Tissue." (See RESEARCH: Air Pollution)
    c. Longwood Foundation. Amount: $5,877. Project: "Ornamental Plant Breeding - Camellia Research." (See RESEARCH: Camellia)

10. Funds in excess of $40,000 toward construction and furnishing of the Peacock Pavilion housing offices, storage, gift and book shop on lower level; snack; bar on upper level.
11. Donation to the County of Los Angeles of a $16,500 Minibus seating 45 adults. This two-section vehicle is used, together with the previously Foundation-purchased jeep and trailer, to provide free daily tours of the Arboretum.
12. Funds for fountain, benches, and landscaping in the Peacock Pavilion patio. ($5,063)
13. Donations for summer instructors in Youth Education Section. ($1,176)
14. Funds for marble steps to Bauer Pool entranceway. ($9,000)
15. Funds for entranceway concrete benches. ($1,820)
16. Maintenance of jeep and minibus. ($1,936)
17. Funds for planned construction of Manfred Meyberg Memorial waterfall on Tallac Knoll. ($37,500)

The Foundation sponsors alone or with other organizations a variety of events which serve the interests of the public and horticultural specialists. Typical are flower shows, lectures, and exhibits of botanical art. Another example of Foundation activity is its participation with Los Angeles Beautiful and Southern California Horticultural Institute in matching funds to publish booklets on flowering trees, vines and shrubs in connection with the "Celebrate with Color" program for state and national beautification.

Descanso Gardens Guild

The Guild was formed in 1958 by a group of civic-minded citizens determined to preserve Descanso Gardens by helping to make it a facility of the County. From that time to the present, the Guild has contributed generously to the Gardens' development, never more effectively than under the leadership of its president, Mrs. Forrest Kresser Smith.

This past biennium saw the fruition of the Guild's most impressive effort to date—the dedication and presentation of an Oriental Teahouse to the County of Los Angeles. (See photo and caption under GROUNDS DEVELOPMENT.) This structure and surrounding Japanese garden have proven a delight to visitors from all over the world. The garden was created by members of the Japanese-American community and the Descanso Gardens staff.

The Guild sponsors many events which attract visitors to the Gardens. A new one was a bonsai show held September 24-25, 1966. Attendance for those weekend dates was 7,700, prompting plans to make the show an annual affair.

The Guild's most spectacular event is the biennial Festival of Fountains and Garden Lighting, running approximately six weeks, starting August 1. Close to 60,000 night-time and 31,000 daytime visitors witnessed the display and exhibits in 1965.

A program for handicapped children, sponsored by the Guild and increased by fifty percent in this biennium, served 45 children from the Roosevelt School of Pasadena three times a week, and 25 children from the Home School of Glendale once a week. Much credit and many thanks are due Mrs. Lee Milbank and Mrs. Dorothy Deschler Fulmor for their effective work in this program. These ladies have contributed an impressive 5,600 volunteer hours since 1962; a new docent program is expected to ease their workload as well as contribute to work needs in other areas of the Gardens.

South Coast Botanic Garden Foundation

The South Coast Botanic Garden Foundation, incorporated under the leadership of its founder-president, Mrs. Frances (R. O.) Young, continues its interest and assistance in the development of the South Coast Botanic Garden. Among its regular contributions are the publication of a Quarterly Bulletin giving information on the development of the Garden and on items of horticultural interest to members, and the sponsorship of the Fiesta de Flores, a flower show that has become an annual attraction. In 1967 the show was held June 16, 17 and 18, and drew some 5,000 visitors.

In this biennium, the 8th National Accredited Dahlia Trial Garden under the directorship of Mr. Alan True created interest in a number of foreign countries, seven of which sent tubers for testing. Due to the exceptional care given the Garden by the Dahlia Society and the South Coast staff, the Trial Garden now ranks third in the United States behind the one in the New York Botanic Garden and the one at the University of Michigan.

Garden improvements, such as the Youth Education tool house and cement slab for a Youth Education greenhouse, a floor in the club house, an anemometer and two greenhouses, were made at a cost of $5,053.48. Plants were donated valued at $6,263.

The Infomation Aides, with Mrs. Eugene Hillman, chairman, gave school tours under the guidance of Mrs. Kenneth Norris (see EDUCATION: Youth Section) and have assisted in plant propagating.

Monies are being held in trust for construction of a small waterfall in the stream. A fund has been established for a tram, and another fund established for future physical improvements in the garden as agreed upon in cooperation with the Department.

The Foundation has been handicapped in the securing of donations in this biennium because of problems over which it has no control. It is hoped these problems will soon be rectified in order that the Garden may progress as rapidly as possible.

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Los Angeles Camellia Council

Acknowledgement is made here of the many contributions over the years by the Los Angeles Camellia Council to Descanso Gardens. In this past biennium the Council has presented the following to the Gardens:

A trimmer power mower.

An electric water heater and shower for the use of Garden employees.

A circulating pump for a garden pool.

A chain saw for the tree crew.

Outdoor lights for the road to the Hospitality House.

Departmental Summary
1965 - 66

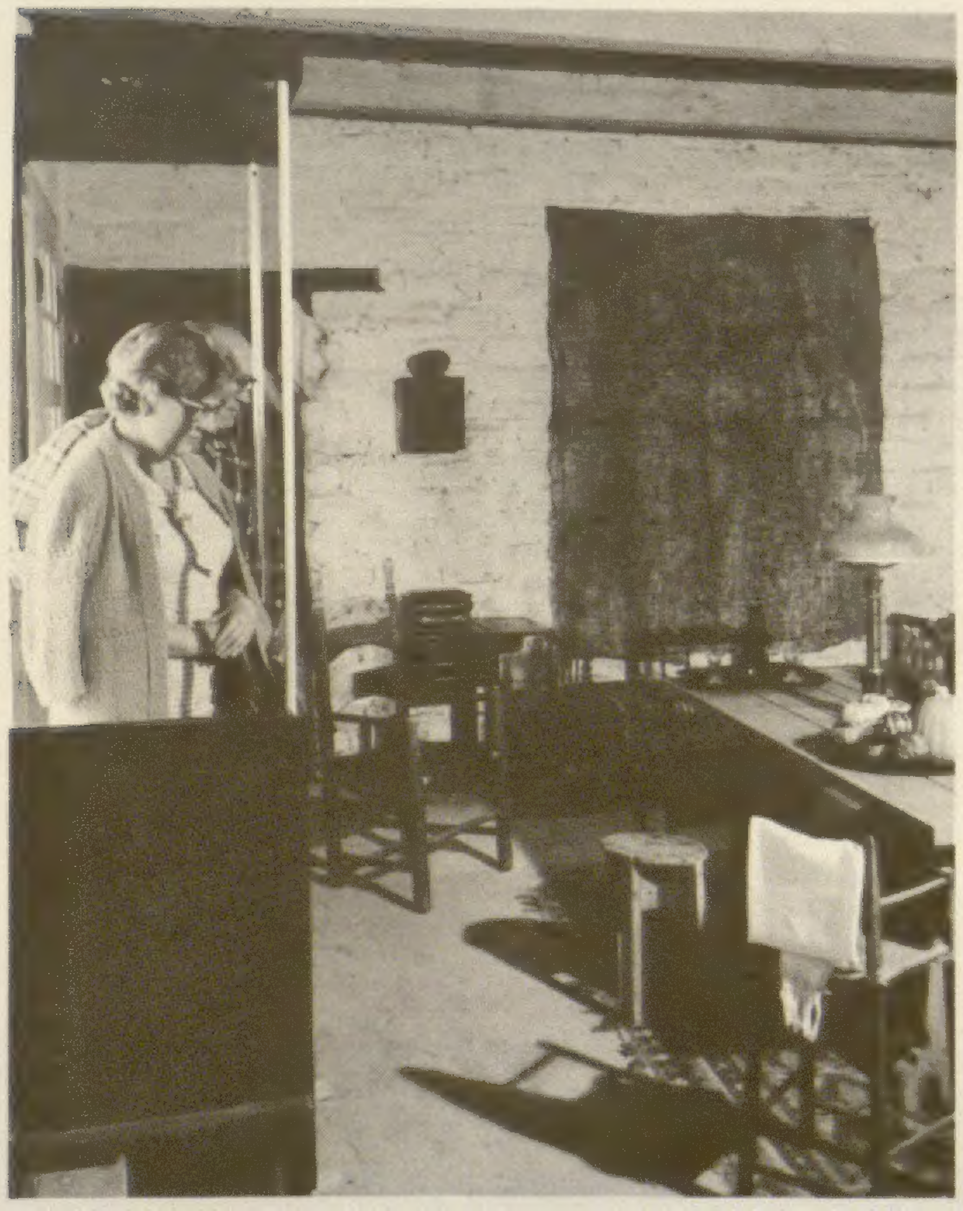
	Appropriation	Expenditures	Balance
Salaries and Wages	$ 835,983.00	$ 806,579.00	$ 29,404.00
Services and Supplies	107,237.00	136,340.00	(- 29,103.00)
Capital Outlay Equipment	24,405.00	19,501.00	4,904.00
Total Department	$ 967,625.00	$ 962,420.00	$ 5,205.00

Number of Budgeted Positions 124.3

1966 - 67

	Appropriation	Expenditures	Balance
Salaries and Wages	$ 887,635.00	$ 871,163.00	$ 16,472.00
Services and Supplies	118,291.00	126,098.00	(- 7,807.00)
Capital Outlay Equipment	22,065.00	22,030.00	35.00
Total Department	$1,027,991.00	$1,019,291.00	$ 8,700.00

Number of Budgeted Positions 129.3



Arboretum -

One of two viewing windows built into doorways of the Hugo Reid Adobe so that visitors might see artifacts close-up without disturbing the interior of historic structure built in 1839, restored in 1957. The window in the picture looks into the "sala." Windows were a gift of Las Voluntarias.

LITHOGRAPHED BY CENTRAL DUPLICATING BUREAU/COUNTY OF LOS ANGELES